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(पहला पुनरीक्षण)

Indian Standard

INDEXABLE HARDMETAL (CARBIDE) INSERTS WITH WIPER EDGES, WITHOUT FIXING HOLE — DIMENSIONS

(First Revision)

ICS 25.100.01

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

December 1998 **Price Group 6**

Single Point Cutting Tools, Carbide Tips and Indexable Inserts Sectional Committee, PE 12

NATIONAL FOREWORD

This Indian Standard (First Revision) which is identical with ISO 3365:1985 'Indexable hardmetal (carbide) inserts with wiper edges, without fixing hole — Dimensions' issued by the International Organization for Standardization (ISO), was adopted by the Bureau of Indian Standards on the recommendation of the Single Point Cutting Tools, Carbide Tips and Indexable Inserts Sectional Committee and approval of the Production Engineering Division Council.

This standard was first published in two parts, that is, IS 11523 (Part 1):1986 and 11523 (Part 2):1986 adopting ISO 3365-1:1977 and ISO 3365-2:1980 respectively under dual numbering system. Consequent upon revision of both the parts of ISO standards and merging into one standard, this revision has been taken up. In view of the practices followed at international level, IS 11523 (Part 1):1986 'Dimensions for indexable (throwaway) carbide inserts for milling cutters : Part 1 Square inserts' and IS 11523 (Part 2):1986 'Dimensions for indexable (throwaway) carbide inserts for milling cutters : Part 2 Triangular inserts' have been merged in this revision by adopting ISO 3365:1985.

In this revision following types of new inserts have been included:

a) Asymmetrical triangular inserts with chamferred corners 90° cutting edge angle, 20° normal clearance and 20° wiper edge normal clearance.

b) Asymmetrical square inserts without chamferred corners, 75° cutting edge angle, 20° normal clearance and 20° wiper edge normal clearance.

This revision will replace the existing IS 11523 (Part 1):1986 and IS 11523 (Part 2):1986.

The text of the ISO standard has been approved as suitable for publication as Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'.

b) Comma (,) has been used as a decimal marker while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

In the adopted standard, reference appears to certain International Standards for which Indian Standards also exist. The corresponding Indian Standards which are to be substituted in their place are listed below along with their degree of equivalence:

(*Continued on third cover*)

Indian Standard

INDEXABLE HARDMETAL (CARBIDE) INSERTS WITH WIPER EDGES, WITHOUT FIXING HOLE — DIMENSIONS

(First Revision)

1 Scope and field of application

This International Standard specifies the dimensions of indexable hardmetal (carbide) inserts with wiper edges, without fixing hole. These inserts are primarily intended to be mounted on milling cutters by top or wedge clamping.

2 References

ISO 513, *Application of carbides for machining by chip removal — Designation of the main groups of chip removal and groups of application.*

ISO 883, *Indexable hardmetal (carbide) inserts with rounded corners, without fixing hole — Dimensions.*

ISO 1832, *Indexable inserts for cutting tools — Designation.*

ISO 3364, *Indexable hardmetal (carbide) inserts with rounded corners, with cylindrical fixing hole — Dimensions.*

ISO 6987/1, *Indexable hardmetal (carbide) inserts with rounded corners, with partly cylindrical fixing hole — Part 1: Dimensions of inserts with 7 degrees normal clearance.*

3 Types of inserts

The types of indexable hardmetal (carbide) inserts specified in this International Standard are the following:

- TP .... PPN:
  symmetrical triangular inserts with 11° normal clearance, 90° cutting edge angle and 11° wiper edge normal clearance;
- TP .... PDR; TP .... PDL:
  asymmetrical triangular inserts with chamfered corners, 11° normal clearance, 90° cutting edge angle and 15° wiper edge normal clearance;
- TE .... PER; TE .... PEL:
  asymmetrical triangular inserts with chamfered corners, 20° normal clearance, 90° cutting edge angle and 20° wiper edge normal clearance;
- SN .... ENN:
  symmetrical square insert with chamfered corners, 0° normal clearance, 75° cutting edge angle and 0° wiper edge normal clearance;
- SP .... EDR; SP .... EDL:
  asymmetrical square insert with chamfered corners, 11° normal clearance, 75° cutting edge angle and 15° wiper edge normal clearance;
- SN .... ANN:
  symmetrical square insert with 0° normal clearance, 45° cutting edge angle and 0° wiper edge normal clearance;
- SE .... EER; SE .... EEL:
  asymmetrical square insert with 20° normal clearance, 75° cutting edge angle and 20° wiper edge normal clearance.

Inserts with wiper edges, without fixing hole are standardized only without chip breakers.

Table 17 gives the range of dimensions of these inserts.

4 Interchangeability

4.1 Tolerances

Indexable hardmetal (carbide) inserts specified in this International Standard are provided in the following tolerance classes in accordance with ISO 1832:

a) inserts with 0° and 11° normal clearance (TP, SN and SP):

tolerance classes A, C and K, where class C is used mainly for coated inserts;

b) inserts with 20° normal clearance (TE and SE):

tolerance class C.

The values of the tolerances in accordance with ISO 1832 are given in annex A.

Other tolerances are included in the diagrams and tables with the insert dimensions in clause 7.

4.2 Dimensions *m*

Dimension *m* specified in the tables refers to a theoretically perfect insert. In practice, as the points on which the inserts are located in both manufacture and measuring may be different, the nominal value of dimension *m* may vary from one manufacturer to another within a range of ± 0,05 mm. Nevertheless, for inserts of the same manufacturer, dimension *m* shall comply with the tolerances in accordance with ISO 1832 (see annex A).

5 Designation and marking

5.1 Designation

The designation of the indexable hardmetal (carbide) inserts complying with this International Standard shall conform to ISO 1832.

In addition to this designation, one or both of the following may be indicated:

- the symbol of the group of application, in accordance with ISO 513;
- the commercial designation of the hardmetal (carbide) grade.

5.2 Marking

The following symbol, at least, shall be marked on the insert itself (except when this would be difficult on the smaller inserts):

- symbol of the group of application, or commercial designation of the hardmetal (carbide) grade (or both, if possible, on large inserts).

6 Measurement

Annex B indicates the methods of measuring the dimension *m* of the indexable inserts covered by this International Standard.

7 Recommended dimensions

The choice of the more common dimensions is restricted to the specifications given in tables 1 to 12. It is strongly recommended that these standard inserts be used wherever possible.

7.1 Triangular inserts

7.1.1 Symmetrical triangular inserts with 90° cutting edge angle, 11° normal clearance and 11° wiper edge normal clearance

TPAN .... PPN
TPCN .... PPN
TPKN .... PPN

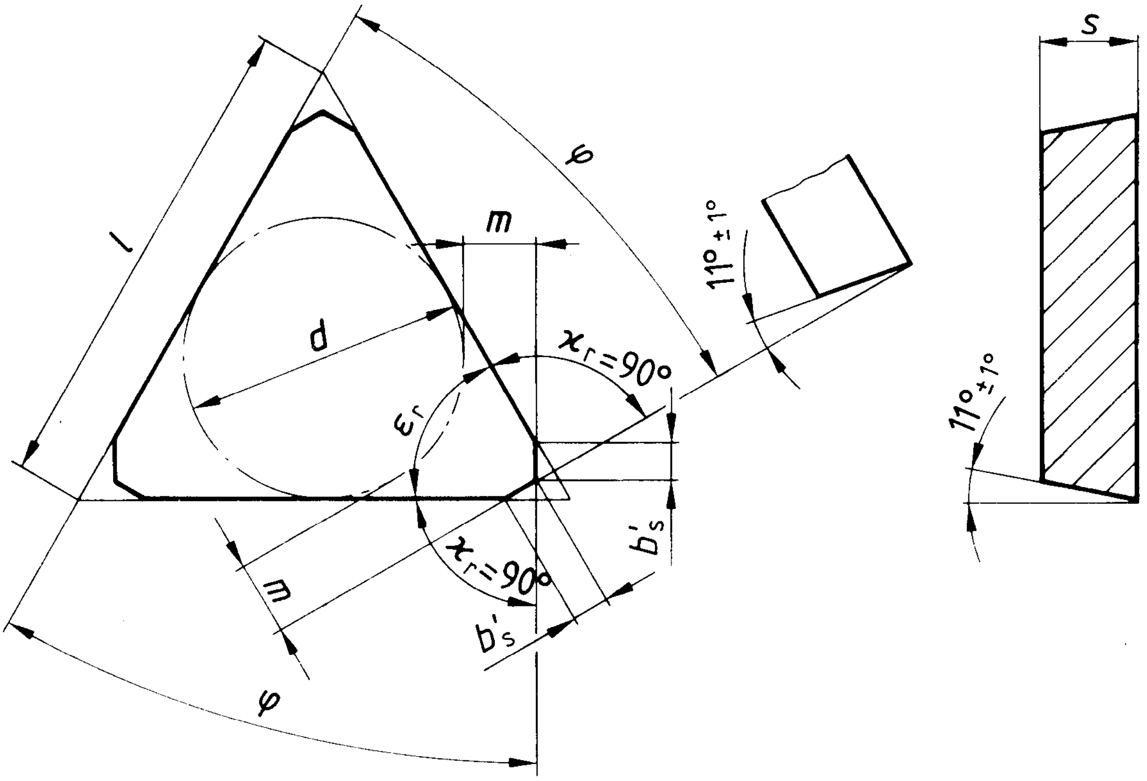

Table 1

Values in millimetres

Insert			l ≈	d 1)	s 1)	m 1)	b'_s ≈	ε_r	φ
TPAN1103 PPN	TPCN1103 PPN	TPKN1103 PPN	11,0	6,35	3,175	1,72	0,7	60°	30°
TPAN1603 PPN	TPCN1603 PPN	TPKN1603 PPN	16,5	9,525		2,45	1,2		
TPAN2204 PPN	TPCN2204 PPN	TPKN2204 PPN	22,0	12,70	4,76	3,55	1,3		

1) Tolerances in accordance with ISO 1832. See annex A.

Table 2

Tolerance class	Tolerances on	
	ε_r	φ
A	± 8′	$^{+15'}_{0}$
C		
K	± 30′	$^{+30'}_{0}$

7.1.2 Asymmetrical triangular inserts with chamfered corners, 90° cutting edge angle, 11° normal clearance and 15° wiper edge normal clearance

TPAN .... PD.
TPCN .... PD.
TPKN .... PD.

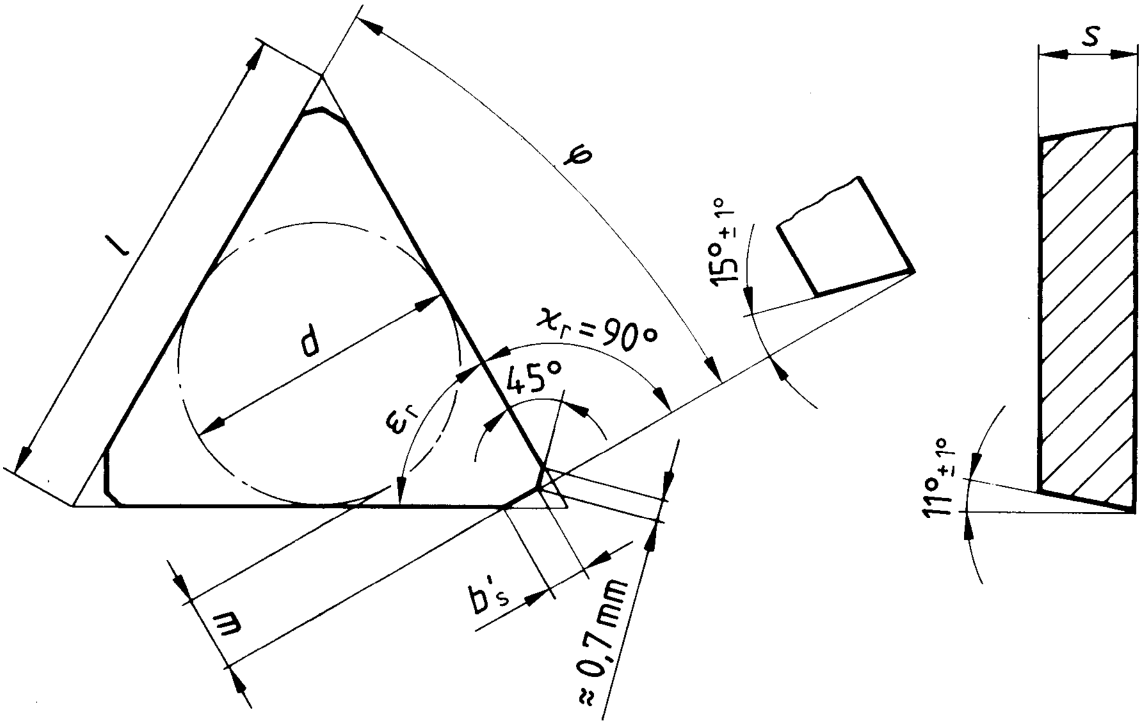

Table 3

Values in millimetres

Insert			l ≈	d 1)	s 1)	m 1)	b'_s ≈	ε_r	φ
TPAN1603 PDR **TPAN1603 PDL**	**TPCN1603 PDR** **TPCN1603 PDL**	**TPKN1603 PDR** **TPKN1603 PDL**	16,5	9,525	3,175	2,45	1,3	60°	30°
TPAN2204 PDR **TPAN2204 PDL**	**TPCN2204 PDR** **TPCN2204 PDL**	**TPKN2204 PDR** **TPKN2204 PDL**	22,0	12,70	4,76	3,55	1,4		

1) Tolerances in accordance with ISO 1832. See annex A.

Table 4

Tolerance class	Tolerances on	
	ε_r	φ
A	± 8′	$^{+15'}_{\ \ 0}$
C		
K	± 30′	$^{+30'}_{\ \ 0}$

7.1.3 Asymmetrical triangular inserts with chamfered corners, 90° cutting edge angle, 20° normal clearance and 20° wiper edge normal clearance

TECN .... PE.

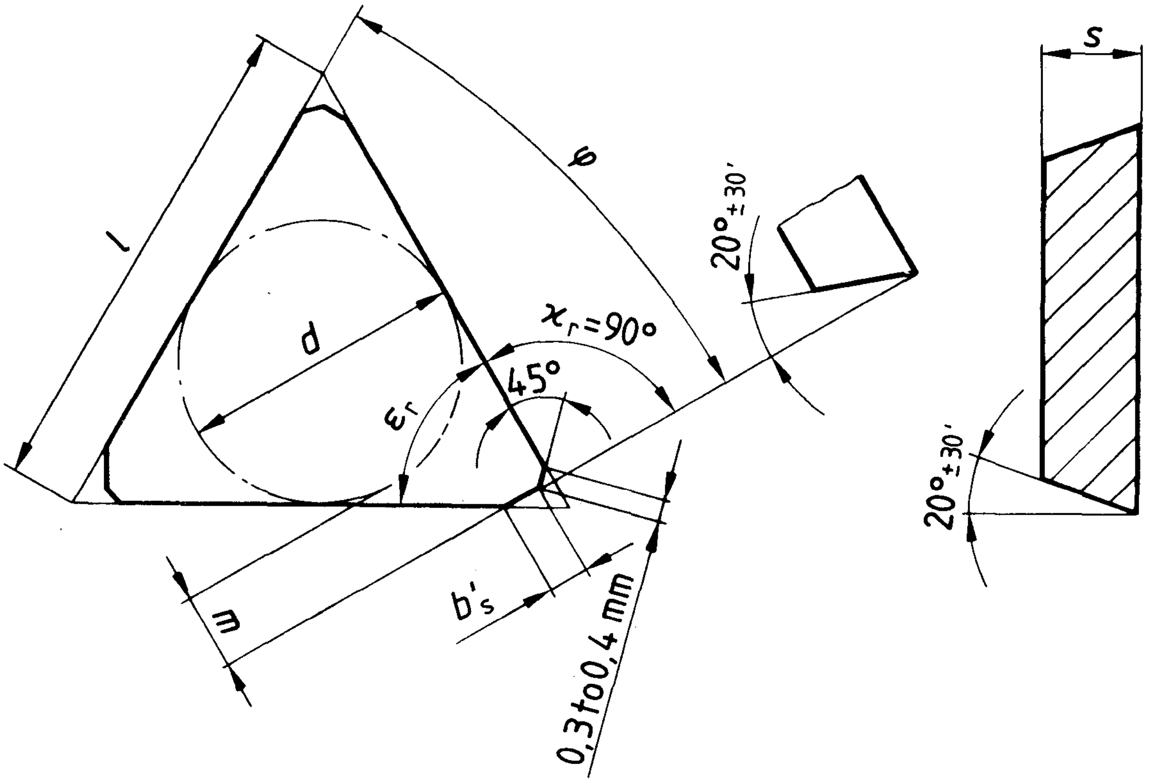

Table 5

Values in millimetres

Insert	l ≈	d 1)	s 1)	m 1)	b'_s ≈	ε_r ± 8′	φ $^{+5'}_{0}$
TECN1603 PER TECN1603 PEL	16,5	9,525	3,175	2,19	2,0	60°	30°

1) Tolerances in accordance with ISO 1832. See annex A.

7.2 Square inserts

7.2.1 Symmetrical square inserts with chamfered corner, 75° cutting edge angle, 0° normal clearance and 0° wiper edge normal clearance

SNAN .... ENN
SNCN .... ENN
SNKN .... ENN

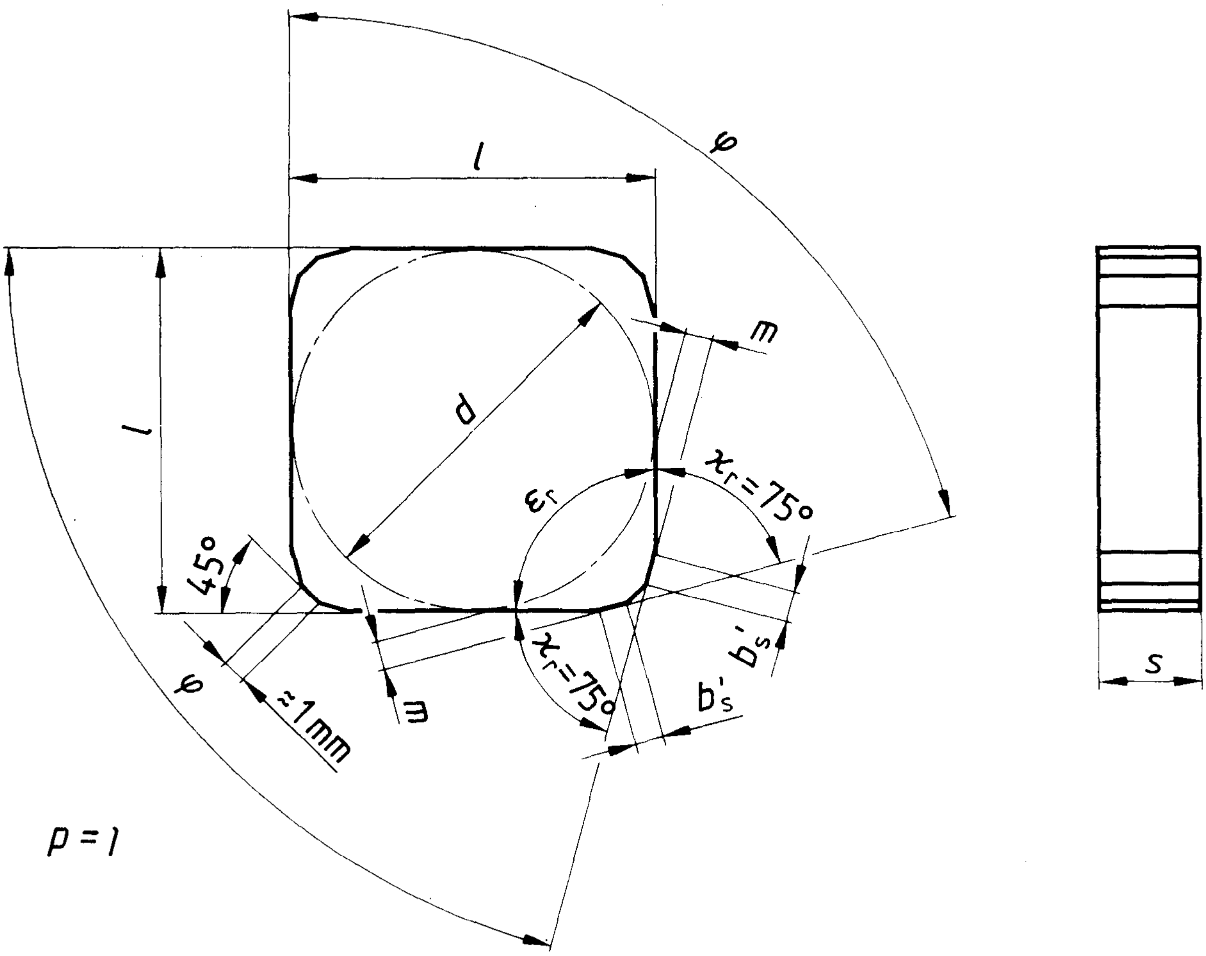

Table 6

Values in millimetres

Insert			d 1)	s 1)	m 1)	b'_s	ε_r	φ
SNAN1204 ENN	**SNCN1204 ENN**	**SNKN1204 ENN**	12,70	4,76	0,80	1,4	90°	75°
SNAN1504 ENN	**SNCN1504 ENN**	**SNKN1504 ENN**	15,875		1,50			
SNAN1904 ENN	**SNCN1904 ENN**	**SNKN1904 ENN**	19,05	4,76 2)	1,30	2,0		

1) Tolerances in accordance with ISO 1832. See annex A.

2) For national standards a thickness of 5,56 mm (SN . N1905 ENN) may be used as an alternative to that of 4,76 mm.

Table 7

Tolerance class	Tolerances on	
	ε_r	φ
A	± 8′	$^{+15'}_{0}$
C		
K	± 30′	$^{+30'}_{0}$

7.2.2 Asymmetrical square inserts with chamfered corner, 75° cutting edge angle, 11° normal clearance and 15° wiper edge normal clearance

SPAN .... ED.
SPCN .... ED.
SPKN .... ED.

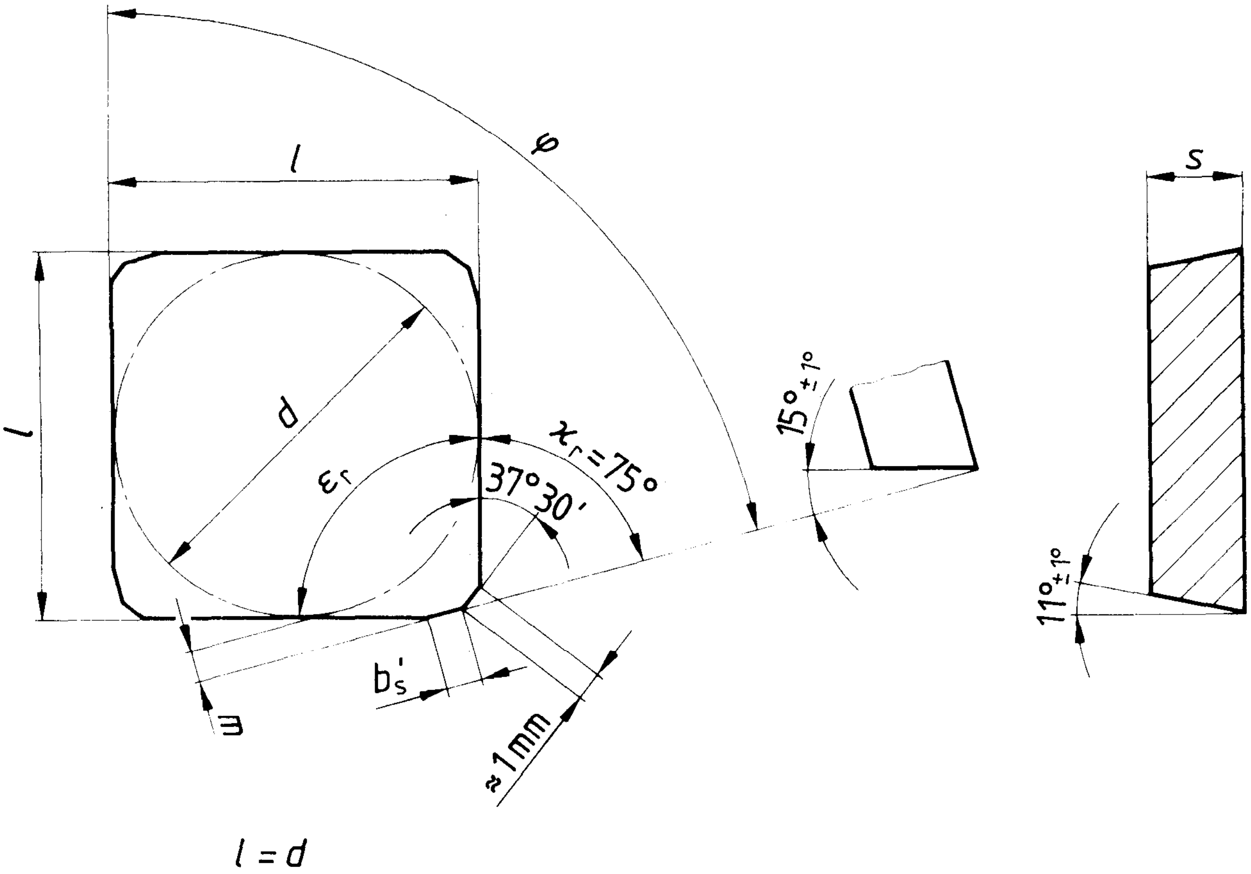

Table 8

Values in millimetres

Insert			d 1)	s 1)	m 1)	b'_s ≈	ε_r	φ
SPAN1203 EDR SPAN1203 EDL	SPCN1203 EDR SPCN1203 EDL	SPKN1203 EDR SPKN1203 EDL	12,70	3,175	0,90	1,4	90°	75°
SPAN1504 EDR SPAN1504 EDL	SPCN1504 EDR SPCN1504 EDL	SPKN1504 EDR SPKN1504 EDL	15,875	4,76	1,25			

1) Tolerances in accordance with ISO 1832. See annex A.

Table 9

Tolerance class	Tolerances on	
	ε_r	φ
A	± 8'	$^{+15'}_{0}$
C		
K	± 30'	$^{+30'}_{0}$

7.2.3 Symmetrical square inserts with 45° cutting edge angle, 0° normal clearance and 0° wiper edge normal clearance

SNAN .... ANN
SNCN .... ANN
SNKN .... ANN

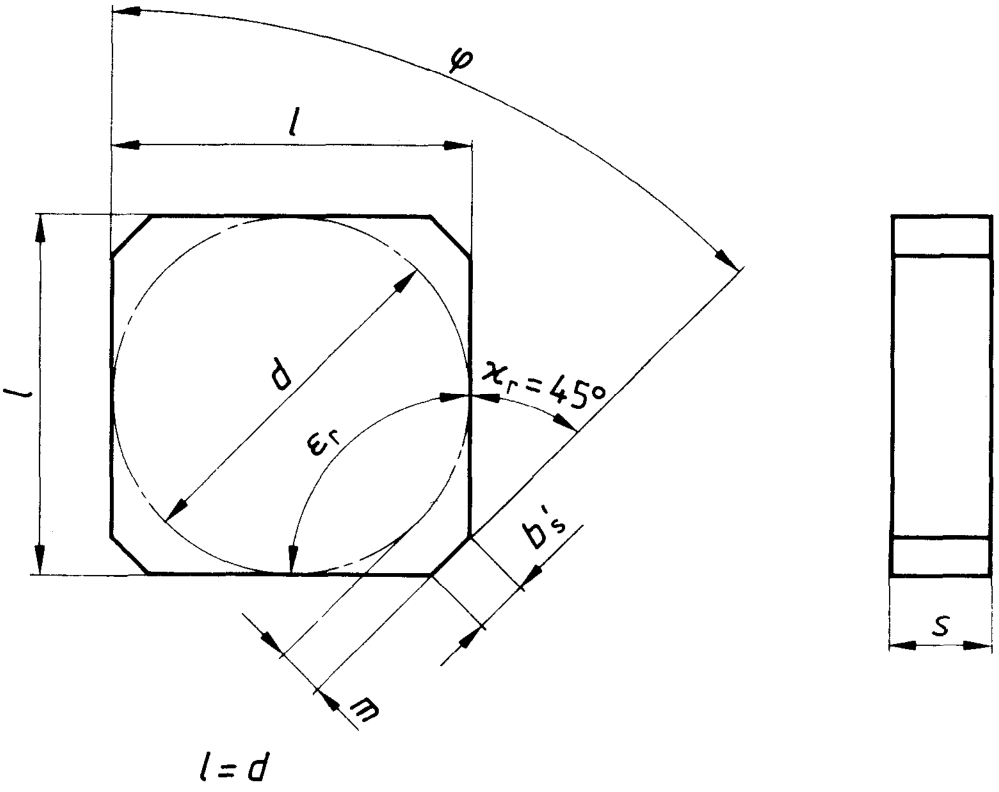

Table 10

Values in millimetres

Insert			d 1)	s 1)	m 1)	b'_s ≈	ε_r	φ
SNAN1204 ANN	**SNCN1204 ANN**	**SNKN1204 ANN**	12,70	4,76	1,60	2,0	90°	45°
SNAN1504 ANN	**SNCN1504 ANN**	**SNKN1504 ANN**	15,875		2,00	2,5		
SNAN1904 ANN	**SNCN1904 ANN**	**SNKN1904 ANN**	19,05	4,76 2)	2,50	3,0		

1) Tolerances in accordance with ISO 1832. See annex A.

2) For national standards, a thickness of 5,56 mm (SN.M1905 ANN) may be used as an alternative to that of 4,76 mm.

Table 11

Tolerance class	Tolerances on ε_r	Tolerances on φ
A	± 8′	± 8′
C		
K	± 30′	± 15′

7.2.4 Asymmetrical square inserts without chamfered corner, 75° cutting edge angle, 20° normal clearance and 20° wiper edge normal clearance

SECN .... EE.

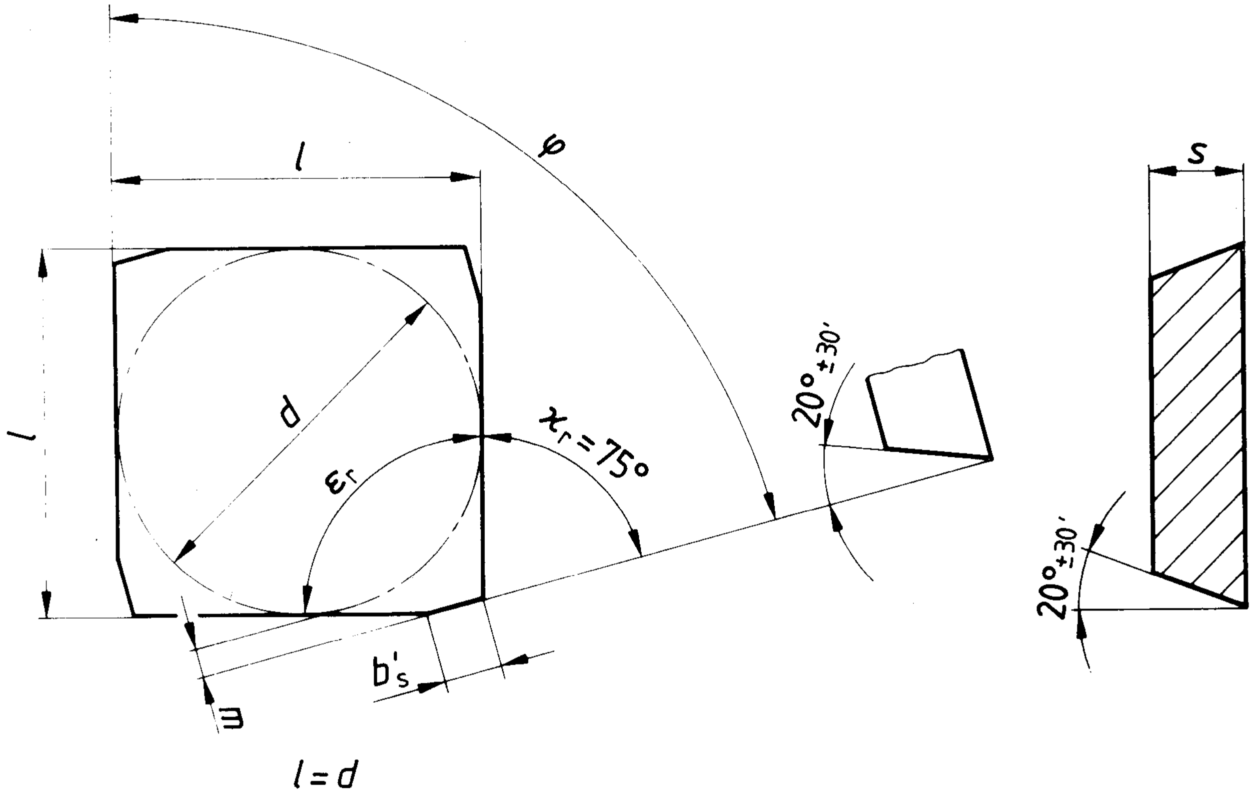

Table 12

Values in millimetres

Insert	d 1)	s 1)	m 1)	b'_s ≈	ε_r ± 8'	φ $^{+5'}_{0}$
SECN1203 EER SECN1203 EEL	12,70	3,175	0,8	2,5	90°	75°

1) Tolerances in accordance with ISO 1832. See annex A.

Annex A

Tolerances for d, m and s

(Extract from ISO 1832.)

A.1 Tolerance class A

Table 13

Values in millimetres

Tolerance for	d	± 0,025
	m	± 0,005
	s	± 0,025

A.2 Tolerance class C

Table 14

Values in millimetres

Tolerance for	d	± 0,025
	m	± 0,013
	s	± 0,025

A.3 Tolerance class K

Table 15

Values in millimetres

Insert		**Tolerances for**		
Designation	d	d	m	s
T...11....	6,35	± 0,05	± 0,013	± 0,025
T...16....	9,525	± 0,05		
T...22.... **S...12....**	12,70	± 0,08		
S...15....	15,875	± 0,10		
S...19....	19,05	± 0,10		

Annex B

Method of measurement of "*m*" dimension

(This annex forms an integral part of the standard.)

B.1 Triangular inserts

Dimension *m* is checked by reference to the diameter *d* of a precision roller, where *d* corresponds to the nominal diameter of the inscribed circle of the insert. The insert is mounted on a 60° vee-block as shown in figure 1 and checked by means of a dial gauge which has been zeroed to dimension *m* by means of a roller with the aid of a gauge block. The dial gauge then gives a direct reading of the error when applied to the inserts to be measured. The roller has a tolerance of ± 0,002 mm.

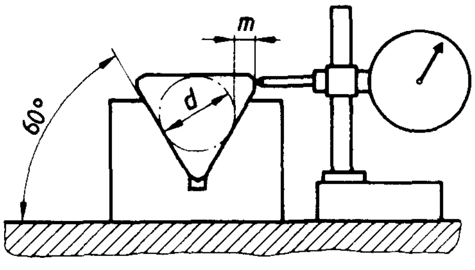

Figure 1

B.2 Square inserts

Dimension *m* is checked by reference to the diameter *d* of a precision roller, where *d* corresponds to the nominal diameter of the inscribed circle of the insert. The insert is mounted on a 90° vee-block as shown in figure 2 a) for inserts with κ_r = 75° (SN .... ENN; SP .... ED; SE .... EE) and in figure 2 b) for inserts with κ_r = 45° (SN .... ANN) and checked by means of a dial gauge which has been zeroed to dimension *m* by means of a roller with the aid of a gauge block. The dial gauge then gives a direct reading of the error when applied to the inserts to be measured. The roller has a tolerance of ± 0,002 mm.

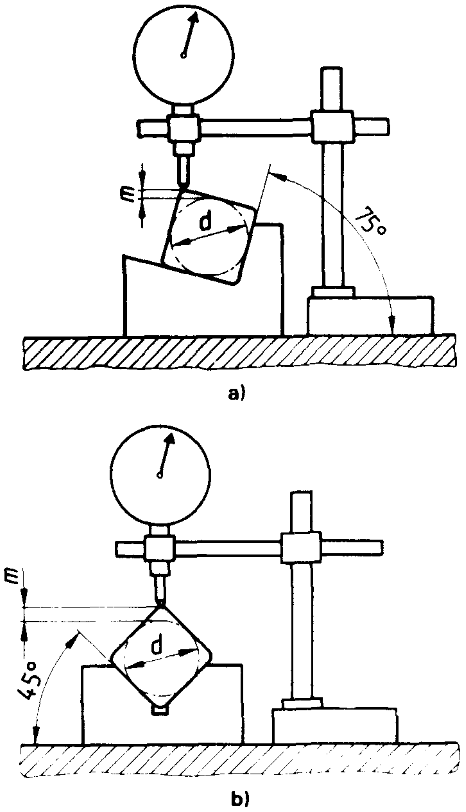

Figure 2

NOTE — Three positioning points of the insert can be useful in the block measuring dimension *m*. In this case, two such points should be on the clearance that is angle φ from the wiper edge normal clearance.

Annex C

Range of sizes for inserts with wiper edges, without fixation hole

(This annex forms an integral part of standard.)

Table 17

Normal clearance	Wiper edge normal clearance	Tolerance classes								
			A			C			K	
		Cutting edge angle κ_r								
α_n	α'_n	90°	75°	45°	90°	75°	45°	90°	75°	45°
0°	0°	–	SNAN1204 ENN	SNAN1204 ANN	–	SNCN1204 ENN	SNCN1204 ANN	–	SNKN1204 ENN	SNKN1204 ANN
			SNAN1504 ENN	SNAN1504 ANN		SNCN1504 ENN	SNCN1504 ANN		SNKN1504 ENN	SNKN1504 ANN
			SNAN1904 ENN	SNAN1904 ANN		SNCN1904 ENN	SNCN1904 ANN		SNKN1904 ENN	SNKN1904 ANN
11°	11°	TPAN1103 PPN	–	–	TPCN1103 PPN	–	–	TPKN1103 PPN	–	–
		TPAN1603 PPN			TPCN1603 PPN			TPKN1603 PPN		
		TPAN2204 PPN			TPCN2204 PPN			TPKN2204 PPN		
11°	15°	TPAN1603 PDR TPAN1603 PDL	SPAN1203 EDR SPAN1203 EDL	–	TPCN1603 PDR TPCN1603 PDL	SPCN1203 EDR SPCN1203 EDL	–	TPKN1603 PDR TPKN1603 PDL	SPKN1203 EDR SPKN1203 EDL	–
		TPAN2204 PDR TPAN2204 PDL	SPAN1504 EDR SPAN1504 EDL		TPCN2204 PDR TPCN2204 PDL	SPCN1504 EDR SPCN1504 EDL		TPKN2204 PDR TPKN2204 PDL	SPKN1504 EDR SPKN1504 EDL	
20°	20°	–	–	–	TECN1603 PER TECN1603 PEL	SECN1203 EER SECN1203 EEL	–	–	–	–

(*Continued from second cover*)

International Standards	*Corresponding Indian Standards*	*Degree of Equivalence*
ISO 513 Application of carbides for machining by chip removal — Designation of the main groups of chip removal and groups of application	IS 2428:1998 Application of hard cutting materials for machining by chip removal — Designation of the main groups of chip removal and groups of application (*first revision*)	Identical
ISO 883 Indexable hardmetal (carbide) inserts with rounded corners, without fixing hole — Dimensions	IS 4022:1985 Indexable (throwaway) carbide inserts without fixation hole (*first revision*) (Under revision)	Technically Equivalent
ISO 1832 Indexable inserts for cutting tools — Designation	IS 9897:1993 Indexable inserts for cutting tools — Designation (*first revision*)	Identical
ISO 3364 Indexable hardmetal (carbide) inserts with rounded corners, with cylindrical fixing hole — Dimensions	IS 11677:1986 Dimensions for indexable (throwaway) carbide inserts with cylindrical fixation hole	do

The concerned technical committee has reviewed the provisions of ISO 6987/1 'Indexable hardmetal cutting tools — Hardmetal (carbide) inserts with rounded corners, with partly cylindrical fixing hole — Part 1: Dimensions of inserts with 7 degrees normal clearance and has decided that it is acceptable for use in conjunction with this standard.

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Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Handbook' and 'Standards: Monthly Additions'.

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